

IN THE CLAIMS

Each claim of the present application is set forth below with a parenthetical notation immediately following the claim number indicating the current claim status. The Examiner's entry of the claim amendments, as shown in marked-up form, under Section 1.121 is respectfully requested.

1. (Currently amended) A method for identifying an integrated circuit device having a frequency marker device formed thereon, comprising:

applying power to the frequency marker device;
determining an oscillating the frequency of the frequency marker device; and
associating the oscillating frequency with the integrated circuit device to identify the integrated circuit device according to the determined oscillating frequency.

2. (Original) The method of claim 1 wherein the integrated circuit device comprises an integrated circuit die.

3. (Original) The method of claim 1 wherein the integrated circuit device is one of a plurality of integrated circuit devices formed on a semiconductor wafer, and wherein the step of associating further comprises associating the frequency with the semiconductor wafer.

4. (Original) The method of claim 1 wherein the integrated circuit device is one of a plurality of integrated circuit devices formed during fabrication of a wafer lot, and wherein the step of associating further comprises associating the frequency with the wafer lot.

5. (Original) The method of claim 1 wherein the integrated circuit device is formed during a plurality of processing steps, and wherein the step of associating further comprises associating the frequency with the plurality of processing steps.

6. (Original) The method of claim 1 wherein the integrated circuit device is one of a plurality of integrated circuit devices formed on a semiconductor wafer, and wherein the step of associating further comprises associating the frequency with a location of the integrated circuit device on the semiconductor wafer.

7. (Original) The method of claim 1 wherein the frequency marker device comprises a ring oscillator, and wherein the frequency of the frequency marker device comprises a ring oscillator characteristic frequency.

8. (Original) The method of claim 1 wherein the frequency marker device comprises an odd-numbered plurality of serially connected inverter elements and a feedback loop.

9. (Original) The method of claim 8 wherein each one of the plurality of inverter elements comprises a binary logic inverter.

10. (Original) The method of claim 1 wherein the integrated circuit device is one of a plurality of integrated circuit devices formed on a semiconductor wafer each one of the plurality of integrated circuit devices comprising a ring oscillator, and wherein the method further comprises determining an oscillating frequency of the ring oscillator of each one of the plurality of integrated circuit devices, and wherein the step of associating further comprises associating the oscillating frequency of the ring oscillator of each one of the plurality of integrated circuits devices with a location of the integrated circuit device on the semiconductor wafer.

11. (Currently amended) A method for manufacturing semiconductor devices, comprising:

- (a) providing a semiconductor wafer;
- (b) performing semiconductor fabrication processes on the semiconductor wafer;
- (c) forming semiconductor dice thereon in response to the fabrication processes, wherein the semiconductor dice comprise semiconductor devices, and wherein certain of the semiconductor dice comprise a frequency marker device;
- (d) applying power to the frequency marker device of a one of the semiconductor dice;
- (e) determining the oscillating frequency of the frequency marker device of the step (d);
- (f) associating the oscillating frequency with the one of the semiconductor dice;
- (g) repeating the steps (d) through (f) for each one of the semiconductor dice comprising a frequency marker device;

(h) singulating the semiconductor wafer into individual semiconductor dice; and
(i) maintaining the association of the step (f) after the semiconductor dice are singulated to identify the integrated circuit device according to the determined oscillating frequency.

12. (Original) The method of claim 11 wherein the step (f) further comprises associating the oscillating frequency with the semiconductor wafer.

13. (Original) The method of claim 11 wherein the step (f) further comprises associating the oscillating frequency with the semiconductor fabrication processes of the step (b).

14. (Original) The method of claim 11 wherein the step (f) further comprises associating the oscillating frequency with the location of the semiconductor dice on the wafer.

15. (Currently amended) An integrated circuit die comprising a frequency identifier that can be determined to correlate the die with the location in a manufacturing wafer.

16. (Original) The integrated circuit die of claim 15 wherein the identifier can be used to associate the die with a location on a wafer in the wafer lot.

17. (Original) The integrated circuit die of claim 15 wherein the frequency identifier comprises a ring oscillator, and wherein a characteristic frequency of the ring oscillator can be determined to correlate the die with the location in the manufacturing lot.

18. (Original) The integrated circuit die of claim 17 wherein the ring oscillator comprises an odd number of serially connected inverters and a feedback loop supplying an output signal of a last one of the serially connected inverters to an input of another one of the serially connected inverters.

19. (Original) The integrated circuit die of claim 15 further comprising correlating the frequency identifier with fabrication process steps of the wafer lot.

20. (New) A method for identifying an integrated circuit device having a frequency marker device formed thereon, comprising:

applying power to the frequency marker device;

determining an oscillating frequency of the frequency marker device; and

associating the oscillating frequency with the integrated circuit device to identify a failed integrated circuit device according to the determined oscillating frequency.